NOTES FROM PACIFIC COAST OBSERVATORIES.

Note on Comet Holmes.

Search was made for Comet Holmes with the 36-inch telescope on several nights before its rediscovery by photography by Professor Wolf, on August 28, 1906, and also on several nights in September. The conditions were fairly good, and an object as bright as 15th magnitude ought to have been detected, but the comet was not seen.

According to the corrections to Zwiers's ephemeris given by the photographic observations, the comet's place was certainly examined, and it is therefore safe to conclude that its visual magnitude was below 15.

Poor seeing on moonless nights in late October, when the comet reached its maximum theoretical brightness, and in the following months, prevented further search.

March, 1907. R. G. Aitken.

A Simple Method of Computing the Lengths of Slender Uneclipsed Solar Crescents.

In a note on the contact times of the total solar eclipse of 1898 Professor Campbell called attention to the fact that the times as computed from the data of the different ephemerides were not as consistent as might be wished, but in the case of that eclipse, as well as with earlier ones, there seems to be no evidence of a systematic variation of the observed from the computed times. For the eclipse of May 28, 1900, the preliminary report of the Lick Observatory–Crocker Eclipse Expedition to Georgia shows a difference of some seven or eight seconds between the computed and observed times of second contact. At the eclipse of August 30, 1905, the discrepancy was found to be greater. The Lick Observatory party reported a difference of seventeen seconds for second contact and twenty-three for third, while other observers also found that totality occurred about twenty seconds earlier

than predicted. The difference is understood to be due to the increasing error of the Moon tables at present in use.

To obtain a very approximate time for the beginning of totality which shall be practically independent of the error of the lunar tables, the interval before the beginning of totality that the uneclipsed crescent of the Sun subtends a definite angle at the Sun's center may be computed. A number of observers have used this method, and Dr. DOWNING has computed these data for the eclipse of January 3, 1908. In addition to the times of contact computed in the ordinary way, he gives the times before the commencement of totality corresponding to cusp angles 90°, 60°, 45°, 30°, and 15°. A note on the method used here in recomputing these values might not be without interest to eclipse observers.

The ordinary eclipse formulæ give us the following:—

$d =$ Duration of totality.

P_2 and $P_3 =$ Points of contact II and III, with their position-angles from the *E–W* line.

Let $a =$ semi-diameter of Sun in seconds of arc, and $b =$ semi-diameter of Moon in seconds of arc, corrected for augmentation. Draw the *E–W* and *N–S* lines through *O,* the center of the Sun.

Then, if C_2 and C_3 are the positions of the Moon's center at contacts II and III, they will lie on $P_2 O$ produced and $P_3 O$ produced, respectively, each at a distance $b = a$ seconds from *O*. A line drawn through C_2 and C_3 will be the path of the Moon's center relative to *O,* and the distance $C_2 C_3$ will be traversed in *d* seconds of time. The velocity of the Moon's motion in seconds of arc per second of time is therefore $\frac{C_2 C_3}{d}$. This velocity is readily obtained, since in the triangle $O C_2 C_3$, the sides $O C_2$ and $O C_3$ are known, and the angle at *O* is the supplement of the sum of the position-angles.

Suppose the Moon's center at *L* when the semi-angle at the Sun's center subtending the arc joining the cusps of the uneclipsed crescent is α. Draw *L M* and *O M* to one of the cusps, and also *L O,* which bisects the angle subtending the cusps.

From the triangle *L O M, L O* may now be computed, having which, the triangle $L C_2 O$ is solved for $L C_2$. This is the

distance over which the Moon's center must move before beginning of totality, and the velocity being known, the time is also determined.

G. B. Blair.

March, 1907.

Increased Water Supply on Mt. Hamilton.

The following description of a new pumping plant at Mt. Hamilton is published for its possible interest to other mountain observatories.

Up to the present time the Lick Observatory has obtained its water supply from a small spring (Aquarius) in the north cañon, located about one mile northeast and 325 feet lower than the observatory buildings. The flow from this spring exceeded the consumption in the late winter and early spring months and fell far short of the consumption in the summer and fall months. The storage and distributing reservoirs on Kepler Peak, one half mile east and fifty feet higher than the buildings, supplied the deficiency during the dry season. The needs of the observatory for household and photographic purposes were met by this system, provided the rainfall for the year had been normal and constant care was taken to guard against leaks in the system. In seasons when the rainfall fell below the normal, it was necessary to use the water under short-allowance rules. This has occurred four or five times during the history of the observatory and has been a serious matter, especially as the system of fire protection was impaired just at the time of the year when it was most needed.

Plans were formed two years ago to increase the water supply, based upon the use of a spring in the south cañon, which is 300 feet lower than Aquarius, but whose flow is at least fifteenfold greater than that of Aquarius.

The system of pumping is a somewhat novel one, and I am under great obligations to Mr. J. A. Lighthipe, head of the Engineering Department of the General Electric Company in this district, for calling my attention to it.

The spring is 680 feet lower than the Kepler reservoirs, and the distance between the two, measured on the thirty-degree slope, is 1,400 feet. Catchment reservoirs, capacity 12,000 gallons, have been established at the spring. A two-inch power and supply pipe leads from these reservoirs farther down the steep cañon, a distance of 700 feet on the slope, and